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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/658,214	09/08/2000	Peter Schroeder	06618/579001/CIT3148	3217

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FISH & RICHARDSON, PC
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EXAMINER	
ARNOLD, ADAM	

ART UNIT	PAPER NUMBER
2671	

DATE MAILED: 08/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/658,214	SCHROEDER, PETER	
	Examiner	Art Unit	
	Adam Arnold	2671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-17 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1, 3-12 and 14-17 is/are rejected.

7)☒ Claim(s) 2 and 13 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 08 September 2000 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 7/2/2001.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 12 recites the limitation "said residuals" in the last line. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3-7 and 9 are rejected under 35 U.S.C. 103(a) as being obvious over Kolarov, U.S. Patent No. 6,144,773. Referring to claim 1, Kolarov discloses a method of compression of arbitrary topology surfaces (col. 1, line 4), comprising: obtaining an input representation of the topology (col. 12, lines 3-5) forming a mesh representing a geometry of the surface where at least one vertex of the mesh is in a different location then a vertex of the original representation (col. 12, lines 14-17, where subdividing will inherently change vertex locations), and forming a compressed version of the mesh (col. 14, line 12). Kolarov does not disclose where the mesh is semi-regular. Kolarov does disclose a recursive regular subdivision of triangles (col. Col. 12, lines 14-17). At the time the invention was made it would have been obvious to a person of

ordinary skill in the art to utilize a semi-regular mesh. One of ordinary skill in the art would have been motivated to do this in order to perform compression on complex geometries (col. 1, line 48—since semi-regular meshes are more irregular than the meshes in Kolarov, it is the type of "complex geometry" envisioned by that invention).

Referring to claim 3, Kolarov discloses where obtaining a mesh comprises changing a location of samples (col. 23, line 42, i.e. compression of "dynamically changing data sets).

Referring to claim 4, Kolarov discloses where the compression comprises changing connectivity between vertices (col. 10, line 61).

Referring to claim 5, Kolarov discloses wherein the forming comprises carrying out a wavelet transform to replace the original mesh with a coarse mesh and a sequence of wavelet coefficients (col. 10, line 60).

Referring to claim 6, Kolarov discloses where wavelet coefficients define a difference between a current mesh and a more detailed mesh (col. 10, lines 30-39).

Referring to claim 7, Kolarov discloses forming a coarsest mesh (col. 9, line 41) and carrying out a transform, which removes correlation between vertices of remaining portions of the mesh (col. 9, lines 59-62).

Referring to claim 9, Kolarov discloses where the transform is used for higher order decorrelation and subdivision based reconstruction (col. 5, lines 14-18, showing subdivision and decorrelation, or concentrating information to fewer samples).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37

CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

2. Claim 8 is rejected under 35 U.S.C. 103(a) as being obvious over Kolarov in view of Cowsar, U.S. Patent No. 6,285,372. Kolarov does not disclose where the transform is Loop based. Loop subdivision is a smoothing technique, and Kolarov does provide for improving smoothness by utilizing wavelet transforms (col. 3, line 20). Cowsar discloses a Loop based transform (col. 14, lines 41-51). At the time the invention was made it would have been obvious to a person of ordinary skill in the art to utilize a Loop based transform. One of ordinary skill in the art would have been motivated to do this in order to facilitate processing complex, dense meshes (see Cowsar, col. 1, line 28).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C.

102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

3. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deering, U.S. Patent No. 6,088,034, in view of Masuda, U.S. Patent No. 6,201,881. Referring to claim 10, Deering discloses obtaining information on a 3D part (col. 6, line 7), including parameter information that is described by displacements in positional data (col. 8, line 5) and geometry data normal to the surface (col. 8, line 5); and compressing the information (col. 3, lines 50-52) by allocating bits preferentially to the normal direction (col. 10, lines 8-14). Deering does not disclose displacement in the tangent plane to the surface. Masuda discloses displacement of a vertex within a tangential plane (col. 11, lines 17-22). At the time the invention was made it would have been obvious to a person of ordinary skill in the art to obtain parameter information

on displacement in the tangential plane to the surface. One of ordinary skill in the art would have been motivated to do this in order that the appearance of a model is relatively unchanged after processing the vertex data (see Masuda, col. 12, lines 14-17).

Referring to claim 11, Deering in view of Masuda discloses where compression comprises first forming a mesh of parameter information more regular than an original (col. 7, lines 58-67).

Referring to claim 12, Deering in view of Masuda discloses where compression comprises uneven scaling of components (col. 10, lines 29-31).

4. Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deering in view of Masuda, further in view of Kolarov. Referring to claim 14, Deering in view of Masuda does not disclose where compressing comprises hierarchical transformation of meshes through a hierarchical transform. Kolarov discloses where compressing comprises using a hierarchical wavelet transform of meshes (col. 5, lines 7-10). At the time the invention was made it would have been obvious to a person of ordinary skill in the art to perform compression by utilizing a hierarchical transform. One of ordinary skill in the art would have been motivated to do this because a hierarchical transform is a powerful and flexible tool for data reductions (see Kolarov, col. 3, lines 17-18).

Referring to claim 15, Deering in view of Masuda does not disclose where the transform is based on subdivision methods. Kolarov discloses a transform based on subdivision methods (col. 4, line 65). At the time the invention was made it would have been obvious to a person of ordinary skill in the art to have the transform based on subdivision methods. One of ordinary

skill in the art would have been motivated to do this in order to perform compression on complex and "higher dimensional geometries" (see Kolarov, col. 2, line 28).

Referring to claim 16, Deering in view of Masuda does not disclose where the transform includes a wavelet transform. Kolarov discloses a wavelet transform (col. 4, line 64). At the time the invention was made it would have been obvious to a person of ordinary skill in the art to utilize a wavelet transform. One of ordinary skill in the art would have been motivated to do this in order to perform compression on complex and "higher dimensional geometries" (see Kolarov, col. 2, line 28).

Referring to claim 17, Deering in view of Masuda does not disclose where the transform is wavelet coefficients with a zero tree coder. Kolarov discloses wavelet coefficients with a zero tree coder (see claim 16 and col. 8, line 42). At the time the invention was made it would have been obvious to a person of ordinary skill in the art to utilize wavelet coefficients with a zero tree coder. One of ordinary skill in the art would have been motivated to do this in order because it is a fast and efficient method to bit encode wavelet coefficients (see Kolarov, col. 8, line 57).

Allowable Subject Matter

5. Claims 2 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not anticipate, nor does it suggest, the invention as claimed in claim 2. The

prior art of record does not disclose where forming a mesh comprises sliding at least one vertex within a surface of the topology to a location where better compression can be obtained.

The prior art does not anticipate, nor does it suggest, the invention as claimed in claim 13. The prior art of record does not disclose where the more regular meshes have substantially only normal prediction residuals.

The above indicated limitations, particularly in combination with the other limitations in the respective claims are not anticipated or suggested by the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adam Arnold whose telephone number is 703 305 8413. The examiner can normally be reached on Monday through Friday from 7:30 A.M. to 4:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached on 703 305 9798. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MARK ZIMMERMAN
SUPERVISORY PATENT EXAMINER
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